

From the President

By Chris Angelos

This time it's not Rick Morales as FPOA President. The FPOA Board elected me to succeed Rick after his many years of years of dedicated service on the FPOA Board of Directors. Rick has been Secretary, Treasurer and President before retiring from the FPOA Board at the end of 2012. Rick has also been the principal liaison between State Parks and the FPOA during his tenure as resident ranger at the Peak and as a member of the board. No one could hope to equal the decades of service and experience Rick brought to the FPOA. However, I look forward to leading the board in maintaining our unique organization, its facilities, and programs. To me, no endeavors could be more engaging than those of the FPOA.

As most of our members know, several years ago, the FPOA entered into a contract with the state Department of Parks and Recreation to maintain and manage the observatory, its adjacent areas, and to provide a specified number of public programs every year. The FPOA has done all this, and in addition, has established an intern program to involve high school seniors and Hartnell Community College students in learning and bringing the science of astronomy to the public.

The observatory has also been one of the 3 principal sites for a meteor survey called CAMS that was originated by NASA's Dr. Peter Jenniskens. In just 3 years, Peter's program has confirmed about a hundred meteor streams and discovered new ones orbiting the Sun and crossing the Earth's path. Starting in April hundreds of visitors will come to Fremont Peak State Park to see the night sky through the 30 inch Challenger and other telescopes we have at the observatory. I encourage all amateur astronomers to consider joining the FPOA as a member or continuing their FPOA membership. The FPOA gives almost anyone the opportunity to participate in a facility with one of the largest optical telescopes open to the public. FPOA members may do their own observing and with FPOA training provide observing experiences to park visitors.

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FPOA Programs 2013

Saturday Evening Programs

Apr 6, 13, 20 May 4, 11, 18
Jun 1, 8, 15, 29 Jul 6, 13
Aug 3, 10, 31 Sept 7, 28
Oct 5, 12, 26

Solar Programs

Mar 9 Apr 13 May 11 Jun 8
Jul 6 Aug 10 Sept 7 Oct 5

Board Meetings

Jan 12 Feb 9 Mar 9 Apr 13
May 11 Jun 8 Jul 6 Aug 10
Sept 7 Oct 5 Nov 2

Special Events

Star-B-Que Aug 10
Member Appreciation Night Sept 7

Please check <http://www.fpoa.net/schedule.html> for changes or updates to this schedule.

Cams Update

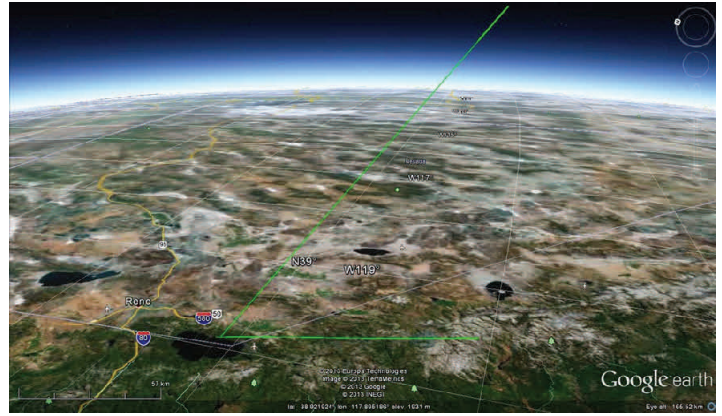
By Dave Samuels

Night turned briefly into day over a wide area in California and Nevada at 5:21:44 am PST on that Thursday morning, creating hopes of another surprise delivery of meteorites like those of the recent Novato and Sutter's Mill falls. However, this bright fireball did not drop meteorites on the ground. This was a head-on collision with a small, perhaps 1-meter sized comet,

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rather than a glancing blow of a stronger asteroid. The comet matter was almost instantly turned into dust and gas.

Three of the CAMS camera stations captured the very early stage of the impact. The meteor was first spotted by the station at Lick Observatory at an altitude of 146.1 +/- 1.0 km (90.8 miles) and was tracked at the stations in Sunnyvale and Fremont Peak Observatory down to 133.8 +/- 0.2 km (83.1 miles). The fireball then moved outside the field of view of any of the CAMS arrays. Extraction of the short fast tracks proved difficult, but CAMS software architect Peter Gural succeeded in extracting each track. From triangulations of these accurate video records, the object's trajectory in the atmosphere and orbit in space were calculated.



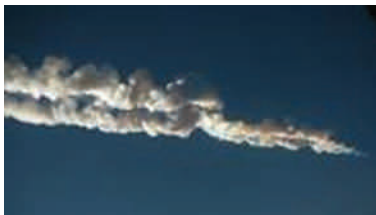
This fireball was widely reported on the AMS website.

(http://www.amsmeteors.org/fireball_event/2013/103).

It was captured on the allsky camera of Jim Collins in Chico, CA. It was also captured on the Skysentinel cameras at Stanford and Nevada City.

(<http://skysentinel.nmsu.edu/allsky/viewer/587950>
<http://skysentinel.nmsu.edu/allsky/viewer/587962>).

Feb 15 Events - SF fireball, Chelyabinsk C/2012 DA14



I wanted to mention the Chelyabinsk Russia super-bolide meteor and some of the other events that occurred during that same day.

Just as we were all getting ready to observe and monitor C/2012 DA14, other events happened around the world. In Chelyabinsk Russia, a huge super-bolide meteor entered the atmosphere at about 18 km/s (40,000 mph), blew out windows for miles, and injured over 1,500 people. Later that day, a large fireball, not nearly as large as Chelyabinsk, fell over the Pacific Ocean west of San Mateo, CA. The Fremont Peak CAMS array didn't capture this event, nor did the San Mateo AutoCAMS station. There were also reports of an event similar to Chelyabinsk in Rodas Cuba (Central Cuba, near Cienfuegos). Many have wondered how we could tell if these were related.

The well-known radiant for 2012 DA14 was approaching from the south is RA 09.92h DEC -81.3° (in the constellation Chamaeleon). Chelyabinsk Russia is at 55.1°N 61.4°E and the event radiant is above and to the left of the rising sun, estimated at RA 22h DEC +20° (in the constellation Pegasus).

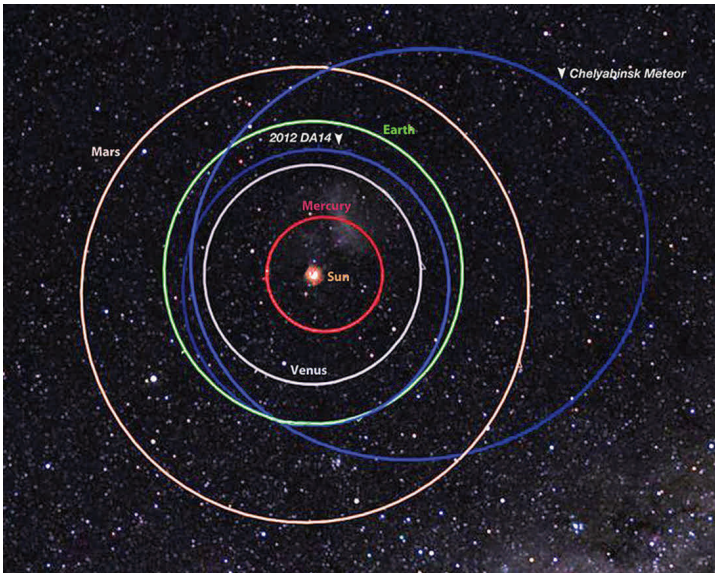


The Sunnyvale CAMS array record of the January 17 fireball. The beginning of the meteor trajectory is visible right of the bright flash that originated well below the field of view.

The meteoroid originated from the Oort cloud and approached Earth on a shallow 19 +/- 7 degrees inclined orbit, moving in opposite direction around the Sun. On Thursday morning, while approaching its nearest point to the Sun (a comet's fastest part of its orbit) at 0.98 +/- 0.03 AU, it found Earth in its way. It approached from the direction of the constellation Virgo, and **collided head-on with the Earth** at a location just north of Yosemite National Park, entering Earth's atmosphere at the fastest possible entry speed of 72 +/- 6km/s (=45 miles per second, or **160 thousand miles per hour!**). Moving toward Lake Tahoe, the small comet then penetrated to lower elevations where it fully disrupted in the atmosphere.

By Patrick Donnelly

These are COMPLETELY different directions. Also, the deep space velocities were quite different. C/2012 DA14's deep space velocity was about 7.8 km/s (17,280 mph) and the Chelyabinsk meteor



was about 18 km/s (40,000 mph). Therefore, these objects were NOT RELATED.

Orbit of the Chelyabinsk meteor (larger elliptical blue orbit) and asteroid 2012 DA14 (smaller circular blue orbit), shows that they are different

Using the dash cam and traffic camera videos, the Chelyabinsk super-bolide was established as an Apollo asteroid (a group of near-Earth earth-crosser asteroids) and about 40 days past perihelion. The radiant was located in the constellation Pegasus. IAU's orbital elements: $Q=2.33$ $q=0.768$ $a=1.55$ $e=0.50$ $i=3.6^\circ$ $\Omega=326.41^\circ$ $\omega=109.7^\circ$.

One last thing is about the kinetic energy reports. Typically, the kinetic energy posted includes all the energy of the object from the moment it approached Earth to the point of impact. It takes into consideration the velocity and mass of the objects. Not all the energy is released at once. In this case, 90 kilotons of TNT energy (of the 440 KT) was released as light energy. There was a huge explosion at 15 miles altitude, which produced a bright flash, small fragmentary meteorites, and a powerful shock-wave, which took over 2.5 minutes to reach the ground. Dr. Petrus Jenniskens, NASA, is onsite collecting samples as I write this. Good luck Peter!

During these long winter nights a real treat for amateur astronomers awaits just below Rigel. This treat is located in the constellation Lepus the Hare. No, it is not the beautiful multiple star H3780 or the only Messier Globular Cluster (M79) in the winter sky. This object is probably the reddest star in the sky. The star is the variable R Leporis (R Lep).

R Lep is located about 6° southwest of Rigel at Right Ascension $04^h 59^m 36.5^s$ and Declination $-14^\circ 48.4'$. R Lep is a "Carbon Star," and as such it is a long period variable star. It is often called "Hind's Crimson Star" because of its colour. British astronomer J. R. Hind first observed the star in 1845. Hind reported that the star appeared "like a drop of blood on a black field."

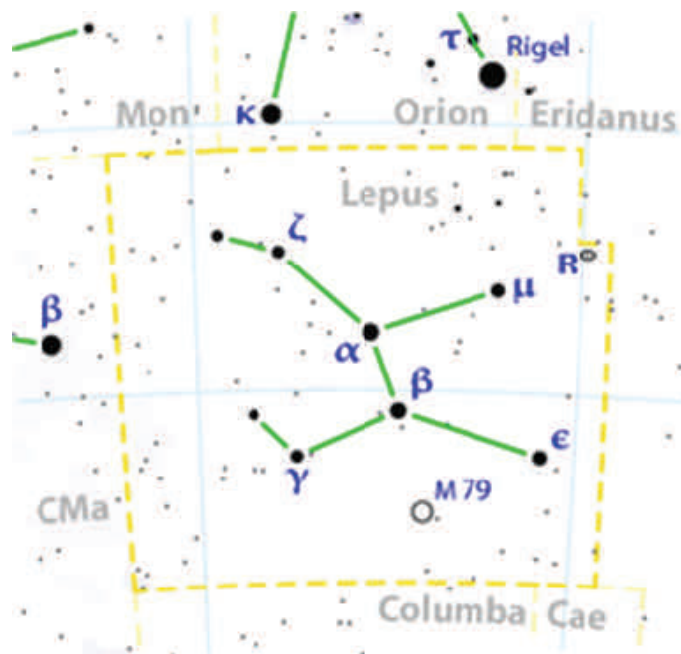
R Lep varies in apparent magnitude from +5.5 to around +11.7 with a period of approximately 427 days. There is also a potential secondary period of approximately 40 years. R Lep is located about 1300 light years from the earth. It is a very large star as are all Carbon Stars. The radius of R Lep is 500 times greater than the radius of the Sun. If R Lep was located where the Sun is, it would engulf our solar system all way to Jupiter. This is one very large star.

As I write this article, R Lep is around apparent magnitude +10.0. Thus, one will need a 4" or larger scope to observe it. This star should brighten to around magnitude +7.0 before disappearing in the March evening twilight. By then a good pair of 7x50 binoculars and a dark sky will reveal R Lep. The colour of R Lep is unmistakable. If R Lep is in your field of view in the telescope, you will know it. R Lep will have a deep red colour. I keep observing this star because I enjoy the obvious colour. You should observe it too, especially if you think the colour of all stars are more or less white.

A finder chart is provided on Page 4.

Dave

The Reddest Star in the Sky



From the President

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I found both to be very rewarding. Please keep an eye on the FPOA events calendar at <http://www.fpoa.net/schedule.html> for public programs, work parties, and other special events for FPOA members will want to attend.

Chris Angelos

2013 Membership Renewal

Renewals are easy. You can use the forms on the membership page <http://www.fpoa.net/membership.html> to pay with either PayPal or via a credit card. For those preferring paper you can just send a check (that has your current correct address) to : FPOA Membership, c/o Rob Hawley, 1233 Hillcrest Dr, San Jose CA 95120

If your email has changed then please be sure to include that in either the PayPal payment as a comment or a note with your check.

EMAIL DELIVERY OF THE OBSERVER

Dear FPOA Members,

We have been delivering the Observer via email for the past several issues. This obviously saves the Association postal expenses, and assures the quickest delivery to you. However, several of you no longer have valid email addresses, due to ISP changes, moves, etc. If you would like to continue to receive, or begin to receive, notification of the Observer via email, please send your current email address to membership at

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The Fremont Peak Observer is published four times a year (Winter, Spring, Summer, Fall). Articles from members are encouraged and should be emailed to ron.dammann at lmco.com. Articles should be in plain text or MS Word format. Deadlines are Feb. 1, May 1, Aug. 1 and Nov 1, respectively.

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